CLAIMS

1. A method for transferring a thin film from a source position to a target position, the method comprising:

positioning the thin film in the source position;

attaching the thin film to a first surface in a first position;

moving the first surface from the first position to a second position wherein the thin film is removed from the source position;

transferring the thin film from the first surface to a second surface, the second surface positioned in a first position;

moving the second surface from the first position to a second position; and

transferring the thin film from the second surface to the target position.

2. The method as recited in claim 1, wherein the thin film is provided in a container having a top and wherein the method further comprises cutting the top of the container to provide access to the thin film.

3. The method as recited in claim 2, wherein cutting the top of the container further comprises cutting the thin film.

4. The method as recited in claim 1, wherein the source position comprises a translatable position and wherein moving the first surface comprises translating the source position.

5. The method as recited in claim 4, wherein moving the first surface further comprises translating the source position toward the first surface.

6. The method as recited in claim 1, wherein the first surface comprises a perforated first surface operatively connected to a source of vacuum and wherein attaching the thin film to the first surface comprises exposing the thin film to the source of vacuum via the perforated first surface.

7. The method as recited in claim 1, wherein the first surface comprises an arcuate surface and wherein moving the first surface comprises rotating the arcuate surface.

8. The method as recited in claim 1, wherein the second surface comprises a perforated second surface operatively connected to a source of vacuum and wherein transferring the thin film from the first surface to the second surface comprises exposing the thin film to the source of vacuum via the perforated second surface.

9. The method as recited in claim 8, wherein transferring the thin film from the perforated second surface to the target position comprises reducing the vacuum provided by the source of vacuum.

10. The method as recited in claim 1, wherein the second surface comprises a thin film release mechanism and wherein transferring the thin film from the second surface to the target position comprises activating the thin film release mechanism.

11. The method as recited in claim 1, wherein the thin film comprises a membrane.

12. The method as recited in claim 1, wherein the thin film comprises a thin film provided in a viscous solution.

13. The method as recited in claim 12, wherein the viscous solution comprises an acidic viscous solution.

14. The method as recited in claim 12, wherein the thin film comprises a fuel-cell membrane.

15. An apparatus for transferring a thin film from a source position to a target position, the apparatus comprising:

means for transferring the thin film from the source position to a first surface in a first position;

means for moving the first surface wherein the thin film is transferred to a second position;

means for transferring the thin film from the first surface to a second surface, the second surface in a first position;

means for moving the second surface from the first position to a second position; and

means for transferring the thin film from the second surface to the target position.

16. The apparatus as recited in claim 15, wherein the thin film is provided in a container having a top and wherein the apparatus further comprises means for cutting the top of the container to provide access to the thin film.

17. The apparatus as recited in claim 16, wherein the means for cutting the top of the container comprises a die cutter having at least one metallic blade.

18. The apparatus as recited in claim 15, wherein the source position comprises a translatable surface.

19. The apparatus as recited in claim 18, wherein the translatable surface is slidably mounted in a support frame.

20. The apparatus as recited in claim 18, wherein the translatable surface is a perforated translatable surface operatively connected to a source of vacuum.

21. The apparatus as recited in claim 15, wherein the first surface comprises an arcuate surface.

22. The apparatus as recited in claim 21 wherein the arcuate surface comprises a drum.

23. The apparatus as recited in claim 21, wherein the means for moving the first surface comprises means for rotating the arcuate surface.

24.The apparatus as recited in claim 21, wherein the arcuate surface comprises a perforated arcuate surface and wherein the means for transferring the thin film from the source position to the perforated arcuate surface comprises a source of vacuum operatively connected to the perforated arcuate surface.

25. The apparatus as recited in claim 15, wherein the second surface comprises a perforated second surface and wherein the means for transferring the thin film from the first surface to the second surface comprises a source of vacuum operatively connected to the perforated second surface.

26. The apparatus as recited in claim 25, wherein the means for transferring the thin film from the second surface to the target position comprises means for reducing the vacuum provided by the source of vacuum to the perforated second surface.

27. The apparatus as recited in claim 15, wherein the means for moving the second surface from the first position to a second position comprises automated manipulators.

28. The apparatus as recited in claim 15, wherein the means for transferring the thin film from the second surface to the target position comprises a thin film release mechanism.

29. The apparatus as recited in claim 28 wherein the thin film release mechanism comprises a plurality of wires.

30. The apparatus as recited in claim 15, wherein the thin film comprises a membrane.

31. The apparatus as in claim 30, wherein the membrane comprises a fuel cell membrane.

32. The apparatus as recited in claim 15, wherein the thin film comprises a thin film provided in a viscous solution.

34. The apparatus as recited in claim 32, wherein the viscous solution comprises an acidic viscous solution.

35. A method for feeding a fuel cell membrane to a fuel cell electrode, the method comprising:

positioning the fuel cell membrane onto a vacuum table;

attaching the fuel cell membrane to an arcuate surface in a first position;

rotating the arcuate surface from the first position to a second position wherein the fuel cell membrane is removed from the vacuum table;

transferring the fuel cell membrane from the arcuate surface to a transfer surface, the transfer surface positioned in a first position;

moving the transfer surface having the fuel cell membrane from the first position to a second position adjacent a fuel cell electrode; and

transferring the fuel cell membrane from the transfer surface to the fuel cell electrode.

36. An apparatus for removing a fuel cell membrane from a container and feeding the fuel cell membrane to an fuel cell electrode, the apparatus comprising:

a vacuum table for accepting the container containing a fuel cell membrane, the container having a top;

a die cutter for cutting the top of the container;

a rotatable drum having a perforated outer surface;

vacuum means for drawing at least part of the fuel cell membrane from the container and on to the perforated outer surface of the rotatable drum;

means for rotating the rotatable drum wherein the fuel cell membrane is transferred from the vacuum table to the rotatable drum;

a perforated surface operatively connected to a source of vacuum for drawing the fuel cell membrane from the rotatable drum to the perforated surface;

means for positioning the perforated surface bearing the fuel cell membrane adjacent the fuel cell electrode; and

means for transferring the fuel cell membrane from the perforated surface to the fuel cell electrode.

37. A thin film handling device comprising:

a perforated surface upon which the thin film is mounted;

a plenum communicating with at least some of the perforations in the surface;

a vacuum operatively connected to the plenum;

and a means for moving the perforated surface.

38. The thin film handling device as recited in claim 37, wherein the perforated surface is an arcuate surface mounted for rotation.

39. The thin film handling device as recited in claim 38, wherein the means for moving the arcuate surface comprises means for rotating the arcuate surface.

40. The thin film handling device as recited in claim 38, wherein the perforated arcuate surface comprises a cylindrical drum.

41. The thin film handling device as recited in claim 40, wherein the interior of the cylindrical drum provides the plenum to which the vacuum is connected.

42. The thin film handling device as recited in claim 37 wherein, the perforated surface is a planar surface.

43. The thin film handling device as recited in claim 37, wherein the perforated surface comprises means for dislodging the thin film from the surface.

44. The thin film handling device as recited in claim 43, wherein the means for dislodging the thin film from the surface comprises hydraulic means, pneumatic means, or mechanical means.

45. The thin film handling device as recited in claim 44, wherein the mechanical means comprises a plurality of wires extending across the surface and moveable relative to the surface.

46. A method for handling thin films comprising: providing a perforated surface in a first position;

providing a source of vacuum operatively connected to the perforated surface;

mounting the thin film on the perforated surface by means of the source of vacuum;

and

moving the surface from the first position to a second position.

47. The method as recited in claim 46, wherein the surface is a planar surface or an arcuate surface.

48. The method as recited in claim 47, wherein the surface comprises an arcuate surface and wherein the arcuate surface comprises the outer surface of a cylindrical drum.

49. The method as recited in claim 46, wherein moving the surface comprises translating the surface in one or more directions.

50. The method as recited in claim 46, wherein moving the surface comprises rotating the surface.

51. The method as recited in claim 46, further comprising dislodging the thin film from the surface.

52. The method as recited in claim 51, wherein dislodging the thin film from the surface comprises hydraulicly, pneumatically, or mechanically dislodging the thin film from the surface.

53. The method as recited in claim 1, wherein the second surface comprises a perforated second surface operatively connected to a source of pressurized gas and wherein transferring the thin film from the perforated second surface to the target position comprises providing pressurized gas to thin film.

54. The apparatus as recited in claim 15, wherein the second surface comprises a perforated second surface operatively connected to a source of pressurized gas and wherein the means for transferring the thin film from the second surface to the target position comprises means for providing pressurized gas to thin film.

55. The thin film handling device as recited in claim 37, further comprising means for pressuring the plenum.

56. The method as recited in claim 10, wherein the thin film release mechanism comprises a plurality of wires.

57. A method for handling a thin film, the thin film provided in a container having a top and a bottom, the method comprising:

providing a first perforated surface, the first perforated surface provided with a source of vacuum;

mounting the container with the thin film on the perforated surface by means of the source of vacuum;

severing the top of the container wherein the top of the container can be displaced;

displacing the top of the container;

providing a second perforated surface, the second perforated surface provided with a source of vacuum; and

transferring the thin film from the first perforated surface to the second perforated surface.

58. The method of claim 57, wherein displacing the top of the container from the container comprises one of manually displacing the top of the container and automatedly displacing the top of the container.

59. The method of claim 57, wherein displacing the top of the container comprises removing the top of the container.

60. The method of claim 57, further comprising moving the second perforated surface having the thin film to a target location.

61. The method of claim 57, where in the method comprises a method for handling fuel-cell membranes.